Abstract

The effect of a chitosan coating on antifungal activity and rate of respiration, chitinase and β, 1-3 glucanase activities with reference to papaya variety 'Rathna' was investigated. One percent chitosan, extracted from locally available prawn waste, was selected as the effective concentration to inhibit spore germination via a series of experiments on potato dextrose agar. Rate of respiration and the concentration of CO_2 in the internal cavity of chitosan-treated and untreated papaya were tested via gas chromatography. Chitinase and β,1-3 glucanase activities were tested in peel samples using gel diffusion and spectrophotometric assays, respectively. Complete inhibition of spore germination was observed in-vitro at treatments of 1% chitosan and above. This concentration significantly ($P < 0.05$) reduced both disease incidence and severity on inoculated fresh papaya. Significant ($P < 0.05$) decrease was observed in rate of respiration while internal CO_2 concentration of the fruit increased ($P < 0.05$) with the chitosan treatment. Chitinase and β,1-3 glucanase activities of papaya variety Rathna subjected to chitosan treatment were much higher than in the untreated control. Chitosan shows antifungal activity to the anthracnose disease causing fungus and stimulates the defense response on the papaya peel by increasing the chitinase and β,1-3 glucanase activities. The antifungal activity of chitosan could be attributed to the induction of elicitation activity due to these defense enzymes. It also forms a semi-permeable coating around the fruit and extends storage life of papaya by reducing the rate of respiration and delaying ripening.

http://www.springerlink.com/content/a0ggj35734804654/fulltext.pdf